Investigation of Physical Activity Levels of Eligible Students in Terms of Various Variables

Erdil DURUKAN[1],
Mehmet GÖKTEPE[2],
Gökhan AYDIN[3],
Leonard STOICA[4]

[1] Assoc. Prof. PhD, Balikesir University, Faculty of Sports Sciences, Balikesir, Turkey, erdurukan@hotmail.com, https://orcid.org/0000-0002-1627-1388
[2] Assoc. Prof. PhD, Balikesir University, Faculty of Sports Sciences, Balikesir, Turkey, mgoktepe06@gmail.com, https://orcid.org/0000-0001-7447-0118
[3] PhD student, Balikesir University, Faculty of Sports Sciences, Balikesir, Turkey, gokhan.aydin@baun.edu.tr, https://orcid.org/0000-0001-5575-3200
[4] Lecturer PhD, Faculty of Physical Education and Sport, Dunarea de Jos University of Galati, Romania, leonard.stoica@ugal.ro, https://orcid.org/0000-0001-6477-5938

Abstract: *This study aimed to examine the physical activity levels of the eligible students to study at the Faculty of Sports Sciences in the current academic year. A total of 200 students participated in the research as a result of the removal of the erroneous questionnaires from the questionnaires applied to 224 students who were eligible to attend the Faculty of Sports Sciences. The "International Physical Activity Questionnaire (IPAQ) short form was applied to the participants. While there was no significant difference according to the gender and body mass index variables values of the students who were entitled to study (p>0.05), a significant difference was found according to the sports branches, sports experience, and the departments they attend (p<0.05). As a result, a significant difference was found according to the departments of the students studying at the faculty of sports sciences according to their physical activity levels, sports experience, and the sports branches.*

Keywords: *sports; sport science; physical activity.*

Introduction

Sport is an extremely important concept that gains meaning as an indicator of the cultural and welfare levels of societies and affects social life holistically (İmamoğlu, 1992). In other words, sport is one of the most basic physical activities. Individuals somehow participate in sports activities in different branches every day. Sport has been an inseparable part of people in every period of history for centuries (Dever, 2008).

The human body is designed to move at an optimum level with minimum effort and to easily withstand the burden of its original structure (Durukan et al. 2020). Physical activity is defined as any bodily movement produced by the contraction of the muscles in the skeletal system and that provide power above the basic level (Kırbaş, 2020; Rus et al. 2019). Another definition referring to physical activity or exercise and it describes the as the consumption of energy that occurs when the muscles are subjected to a force greater than their normal. (Kalaycı et al., 2016).

Sedentary lifestyle has become increasingly common in today's society, due to advancements in technology. With the rise of computers, smartphones, and other devices, people are spending more time sitting or lying down and less time being active. This is especially true for children, young people, and adults who are becoming increasingly addicted to computer games. As a result, this sedentary lifestyle is leading to a decrease in physical activity, which can have negative effects on overall health and well-being. (Kızar et al., 2019). Today, as a result of children and young people being more interested in technology and showing a lot of interest in games played in the digital environment, the concept of e-sports, which is a new sport type, has emerged and it is estimated that e-sports will attract more attention in the future due to intense interest (Kilci, 2019, Kilci et al., 2020).

Along with the technological advances, there has been a decrease in Physical Activities (PA) and the activities expressed with PA have changed. PA measurements are important in terms of determining the PA levels of individuals and directing low-active individuals to physical activity (Baecke et al., 1982; Alexe et al., 2022). According to studies, moderate and high levels of PA can reduce the risk of developing certain cancer types and deaths (Miller et al. 1994; Iordan et al., 2021) If it is known how physically active individuals are, the answer to the question of how much PA should be done can be easily found. The question of "how much, and what kind" of exercise should be searched and measurement methods should be developed (Sallis et al., 1985).

The intensity of physical activity can be expressed as a value related to energy expenditure and peak performance in relation to body weight or resting metabolism in general. In particular, the type of activity is related to one's capacity. The subjects are asked to describe their speed in activities such as walking and cycling. Reference tables play an important role in determining the energy expenditure of physical activity (kJ/min), oxygen consumption (L/min per kg or mL/min), or metabolic equivalent task (MET) in relation to resting states (Arıkan et al., 2019).

METs are multiples of the resting metabolic rate. METs are equal to the metabolic equivalent of a task divided by the resting metabolic equivalent of a normal person. 1 MET equals resting oxygen consumption. Since 200-250 mL of oxygen is consumed on average per minute, 2 METs of work require 2 times the resting oxygen consumption, or 500 mL. MET is quantified by the volume of deoxygen consumed relative to body weight (mL/kg/min) 1 MET= 3.5 mL/kg/min (Küçük, 2012).

There are many ways to measure physical activity, but in terms of their costs, the most appropriate physical activity measurement tool is the questionnaire. One of these questionnaires is the "International Physical Activity Questionnaire (IPAQ) short form" developed by Craig et al. (2003), and the validity and reliability performed by Öztürk M. (2005) (Craig et al., 2003, Öztürk, 2005).

This research aimed to evaluate the physical activity status of the students who attend the faculty of sports sciences.

2. Materials and Methods

Universe and Sample

The research universe was comprised of a sample of 200 students admitted in the 2022-2023 academic year at the Faculty of Sports Sciences, 125 men and 75 women. After removing the erroneous questionnaires, the participants from the 224 questionnaires, 200 questionnaires were included in the study. The demographic variables answered by the participants included information about gender, sports experience, body mass index, sports branch, and the department of the participants.

İnternational Physical Activity Questionnaire (İPAQ); In the study, the "International Physical Activity Questionnaire (IPAQ) short form" developed by Craig et al. (2003) and adapted into Turkish by Öztürk (2005) was used as a data collection tool. According to the survey study, it was

taken as the criterion that physical activities should be performed for at least 10 minutes at a time.

• Intense physical activity duration (team sport games) (min)

• Moderate physical activity duration (cycling, dance, table tennis, etc.) (min)

• Daily walking and sitting times were questioned (min)

The physical activity score (MET-min/week) was calculated by converting the durations of vigorous physical activity, moderate-intensity physical activity, and walking activities to MET (metabolic equivalent minutes), which corresponds to the basal metabolic equivalent in the calculations performed below (Craig et al., 2003).

• Walking score (MET-min/week) = 3.3 *walking time*walking day

• Moderate-intensity activity score (MET-min/week) = 4.0*moderate-intensity activity time*moderate-intensity activity day,

• Intense activity score (MET-min/week) = 8.0 * intense activity duration * vigorous activity day

• Total Physical Activity Score (MET- min/week) = Walking + Moderate-intensity activity + intense activity scores.

At the end of the questionnaire, depending on the score obtained, the result is placed in one of the following classifications: "low, moderate, and intense".

Physical Activity Levels:

1. Low level: Below 600 MET-min/week.

2. Moderate level: 600-3000 MET-min/week.

3. Intense level: Classified as over 3000 MET-min/week.

Data Analysis

The questionnaires collected through face-to-face, questionnaires from the students who were eligible to register were transferred to the SPSS 25.0 package program, and the necessary analyzes were performed on the raw data by removing the erroneous and missing data. To determine the distribution of the data, skewness, and kurtosis values were examined. These values were checked and evaluated between +1.5 and -1.5 (Tabachnick et al., 2007). As a result of the analysis, Mann-Whitney U tests were applied to the variables with two groups, which were determined not normally distributed, and Kruskal Wallis H tests were applied to the variables with more than two groups. The level of significance was determined as $p < 0.05$ in all analyzes.

3. Results

Table 1. Demographic information of the participants

Variables	Category	n	%
Gender	Male	125	62,5
	Female	75	37,5
Sport Branch	Individual Sport	64	32,0
	Team Sport	113	56,5
	None	23	11,5
BMI	Underweight	15	7,5
	Normal	165	82,5
	Overweight	20	10,0
Sport Experience	Less than 5 years	84	42,0
	More Lees than 5 years	116	58,0
Department	Physical Education and Teaching	35	17,5
	Coaching Education	84	42,0
	Sports management	81	40,5
Total		*200*	*100,0*

When the demographic information of the participants were examined, it was seen that 62.5% of the research group was male and 37.5% was female. According to the sports branch, 32% of them were in individual sports and 56.5% in team sports, 11.5% are not engaged in any sports branch, and in the body mass index variable, 7.5% were underweight and 82.5% were normal, and 10% were overweight. Besides, it was determined that 42% of the students participating in the research had sport experience less than 5 years and 58% for more than 5 years. Regarding to the departments of the participants, it was determined that 17.5% of them were entitled to receive education in the department of Sports teaching, 42% were in the department of Sports coaching, and 40.5% were in the department of sports management.

Table 2. Mann-Whitney U Test Results of PA Scores by

	Gender	n	X	Median	Min.	Max.	sd	Rank mean	z	p
PA	Male	125	4763,23	4280,00	0	16902	3482,608	106,02	-1,740	0,08
	Female	75	3825,64	3573,00	0	13968	2549,703	91,31		

PA: Physical Activity

Upon examination of Table 2, it was determined that there was no significant distinction in physical activity scores between male and female students based on gender (p>0.05). Both male and female participants were found to have high levels of physical activity according to the physical activity score classification.

Table 3. Mann-Whitney U Test Results of PA Scores by Sports Experience

	Spor Experience	n	X	Median	Min.	Max.	sd	Mean Rank	z	p
PA	Less than 5 years	84	3601,23	3270,00	0	16452	2618,296	84,68	-3,289	<0,01
	More than 5 years	116	4998,48	4647,00	0	16902	3441,562	111,95		

PA: Physical Activity

According to Table 3, when the sports experience variable was examined, a statistically significant difference was found in the statistical comparison of the participants who was doing sports for less than 5 years and for more than 5 years (p<0.01). According to this, it was seen that the students who was doing sports for less than 5 years had less physical activity points than the students who was doing sports for more than 5 years. However, according to the determined IPA (international physical activity) score classification, it was seen that both groups had a high level of physical activity score.

Table 4. Kruskal Wallis H Test Results of PA Scores According to the Departments of the Participants

	Departments	n	X	Median	Min.	Max.	sd	Mean Rank	x^2	p	Difference
PA	Physical Education and Teaching [a]	35	4940,89	3786,00	400	16452	3588,784	107,39	64,129	<0,001	a>c b>c
	Coaching Education[b]	84	5941,19	5616,50	1538	16902	2971,443	134,30			
	Sports management [c]	81	2596,63	2160,00	0	13968	2186,178	62,47			

PA: Physical Activity

The results of the Kruskal-Wallis-H test revealed a statistically significant difference based on the departments of the students in the Faculty of Sports Sciences. ($p<0.01$). When physical activity scores were examined; it was seen that the students of the coaching education department and the physical education and sports teaching department had higher physical activity scores than the students of the sports management department. According to the results of Bonferroni-corrected pairwise comparisons, which was performed to determine between which groups the difference, was showed that the physical activity scores of the students of physical education and sports teaching and coaching education departments were significantly higher than the sports management department student ($p<0.01$). A lack of significant difference was discovered between the physical education and sports teaching and coaching education students ($p>0.05$). While the physical activity scores of the students in the coaching education department and physical education and sports teaching department were high, the physical activity scores of the students in the management department were at a moderate level.

Table 5. Kruskal Wallis H Test Results of PA Scores by Sports Branch

	Branch	n	X	Median	Min	Max	sd	Mean Rank	x^2	p	Difference
PA	Individual[a]	64	4486,69	3888,50	0	13968	2813,788	104,71			
	Team[b]	113	4886,53	4392,00	0	16902	3413,352	109,12	22,917	<0,001	a>c
	None[c]	23	1869,61	1626,00	0	4771	1477,831	46,43			b>c

PA: Physical Activity

A statistically significant difference was found in the Kruskal Wallis-h test performed according to the sports branch variable in Table 5 ($p<0.01$). As a result of the Bonferroni-corrected pairwise comparisons performed to understand between which groups the difference was, it was determined that the students who were engaged in both individual sports and team sports had higher physical activity scores than the students who did not have a branch. No statistical difference was found between the individual and team sports. When the physical activity levels of the groups were examined, the participants engaged in individual sports and team sports

had a high level of physical activity, while the participants without a branch had a moderate level of physical activity.

Table 6: Kruskal Wallis H Test Results of PA Scores According to BMI Values

	BMI	n	X	Median	Min	Max	sd	Mean Rank	x^2	p	Difference
PA	Underweight	15	4141,73	3937,00	980	7278	1560,489	104,27	0,198	0,906	-
	Normal	165	4496,67	3840,00	0	16902	3395,152	100,73			
	Overweight	20	3912,55	3763,50	0	8532	2229,291	95,80			

PA: Physical Activity

When examined according to the body mass index variable in Table 6, no significant difference was found between the groups classified as underweight, normal weight, and overweight (p>0.0,5). When the body mass index variable was examined according to physical activity levels, it was seen that the underweight, normal and overweight groups had high levels of physical activity.

4. Discussion

The swift rise of industrialization and technological advancements has brought about significant transformations in individuals' lifestyles. The improvements in living conditions brought about by technology and modernization have resulted in many people engaging in very low levels of daily physical activity, leading to a tendency towards a more sedentary lifestyle (Bulut, 2013). Therefore, the importance of physical activity emerges in keeping the human body healthy and preventing physical and physiological disorders that may be caused by inactivity.

In the study we carried out to determine the physical activity levels of the students who were entitled to enroll in the faculty of sports sciences, it was determined that 62.5% of the research group were male, 37.5% were female; 32% were engaged in individual sports, 56.5% were engaged in team sports; 7.5% were underweight, 82.5% were normal, 10% were overweight; 42% of them was doing sports for less than 5 years and 58% of them was doing sports for more than 5 years; 17.5% of them were entitled to study in the physical education and sports teaching department, 42% in the coaching education department, and 40.5% in the sports management department (Table 1).

For the students participating in the research, there was no statistically significant difference found between male and female students in physical activity scores according to gender variable ($p>0.05$). However, contrary to the results of our study; according to the results of Işık, et al. (2015)'s study on university students, it was determined that men have a higher level of physical activity than women (Isık et al., 2015). Similarly, Steptoe et al. (1997); In their study on university students in European countries, they found that the physical activity levels of male students were higher than that of female students (Steptoe et al., 1997). In the study conducted by Yaman (2021), it was found that the total scores of male students were higher than those of female students (Yaman, 2021). Finally, in the study conducted by Buckworth & Nigg (2004) on 493 university students in the USA, it was determined that the physical activity levels of male students were significantly higher than the physical activity levels of female students (Table 2) (Buckworth & Nigg, 2004).

The results indicated a statistically significant difference between the participants who have engaged in sports for less than 5 years and those who have participated for more than 5 years, based on the sports year variable ($p<0.01$). According to this, it was seen that the students who have been doing sports for less than 5 years have fewer physical activity points than the students who have been doing sports for more than 5 years. However, according to the determined IPA (international physical activity) score classification, it was seen that both groups have a high level of physical activity score. For this reason, it can be said that the increase in sports year provides an increase in physical activity levels. A statistically significant difference was found between active sports age and physical activity levels in the study conducted by Çağıran (Çağıran, 2018) which supports our research. In another study, according to Keyf, when the sports age and physical activity levels of individuals were compared, it was seen that the physical activity levels of those who have been doing sports for 1 year were statistically significantly lower than the others. It was stated that the rate of doing sports increases as the sports year progresses (Table 3) (Keyf, 2018).

A statistically significant difference was determined according to the results of the kruskal wallis-h test performed according to the departments of the students who attend the faculty of sports sciences ($p<0.01$). It was established that students in the coaching education department and the physical education and sports teaching department had higher physical activity scores compared to those in the sports management department.

Although there was no significant difference between the physical education and sports teaching department and the coaching education department, it was observed that the department with the highest metabolic equivalent (MET) value was the coaching education department. The reason for this was thought to be since candidates who do not have a sports CV for at least 3 years in the application conditions of the coaching education department of the special talent exam of the Faculty of Sports Sciences of Balıkesir University will not be able to apply. It can be said that the physical activity levels of the candidates applying to the department of sports management were low because they did not been involved in any sports branch. In this context, according to Borazan (2015), who has similar results to these results of our research; a significant difference was found between the departments of the faculty of sports sciences, the significant difference between the sports management and coaching education departments was determined in favour of the coaching education department, the significant difference between sports management and, physical education and sports teaching departments was found in favour of physical education and sports teaching departments. In addition, it was stated that there was no statistically significant difference between physical education and sports teaching and coaching education departments. Another study, conducted by Solmaz & Aydın (2016), determined that the differences in physical activity levels among the sports science faculty students who participated in their research were not statistically significant based on the departments they were enrolled in. These results were not like those of our study (Table 4) (Solmaz et al., 2016).

A statistically significant difference was found in the Kruskal Wallis-h test according to the sports branch variable ($p<0.01$). It was determined that students who were engaged in both individual sports and team sports had higher physical activity scores than students who did not have a branch. In parallel with our research, in the study conducted by Aksu (2018), the physical activity levels of the students differed significantly according to their branches. As a result of the analyzes made, it was determined that the athletes who were engaged in any branch had a higher level of physical activity compared to those who did not have a branch (Table 5) (Aksu, 2018).

Finally, after examination based on the body mass index (BMI) variable, it was determined that there was no significant difference between the participants of the research. ($p>0.05$). In the study conducted by

Borazan (2015), the fact that no significant difference was found when the body mass index values of the students of the faculty of sports sciences and their physical activity status were compared supports our research. However, according to Şanlı and Güzel (2009) in another study, when the physical activity levels of university students according to body mass index were examined, it was seen that as the body mass index increases, the physical activity rate decreases (Table 6) (Şanli et al., 2009). All the authors of this article have an equal contribution to this publication.

5. Conclusions

In conclusion, based on their physical activity levels, a statistically significant difference was observed among the students enrolled in different departments within the Faculty of Sports Sciences, in the level of their sports background, and in terms of whether the type of sports was individual or team sports.

Institutional Review Board Statement: This study was accepted by the E-11811414-050.03-188145 dated 12.10.2022 by the Health Sciences Non-Interventional Research Ethics Committee of T.C. BALIKESIR UNIVERSITY.

Conflicts of Interest The authors declare no conflict of interest. All the authors of this article have an equal contribution to this publication.

References

Aksu, E. O. (2018). *Examination of physical education and sports teacher candidates' physical activity levels in terms of academic achievement and various variables.* Karadeniz Technical University, Institute of Educational Sciences, Department of Physical Education and Sports, Trabzon.

Alexe, D. I., Buzoianu C. C., Tohănean, D., Larion, A, Alexe, C., Paul, D., & Burgueño, R. (2022). Interpersonal behaviors questionnaire in sport: Psychometric analysis with Romanian professional athletes. *Perceptual and motor skills.* https://doi.org/10.1177/00315125221135669

Arıkan, Ş., Barsbuğa, Y., & Revan, S. (2019). Determination of Physical Activity Levels of Taekwondo Coaches. Selcuk University, Faculty of Sports Sciences, *Türk Spor ve Egzersiz Dergisi, Konya*, *21*(2), 270-275.

Baecke, J. A., Burema, J., & Frijters, J. E. (1982). A short questionnaire for the measurement of habitual physical activity in epidemiological studies. *The American journal of clinical nutrition*, *36*(5), 936-942.

Borazan, H. (2015) *Physical activity levels of female students studying at Niğde University, Physical Education and Sports School.* Niğde University Institute of Social Sciences Physical Education and Sports Department, Niğde.

Buckworth, J. ve, & Nigg, C. (2004) Physical activity, exercise, and sedentary behavior in college students. *Journal of American College Health*, *53*(1), 28-34.

Bulut, S. (2013). A social determinant of health; physical activity. *Turkish Journal of Hygiene and Experimental Biology, 70*(4), 205-214.

Çağıran, İ.H. (2018). *Nutrition, ergogenic support usage and physical activity status of students in my Adnan Menderes University sports teams.* Master Thesis, Adnan Menderes Universitesi, Aydın.

Craig, C.L., Marshall, A.L., Sjöström, M., Bauman, A.E., Booth, M.L., Ainsworth, B.E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J.F., & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise, 35*, 1381-1395.

Dever, A. (2008). *Sports with its sociological dimensions.* Cumhuriyet University Institute of Social Sciences, Master Thesis, Sivas.

Durukan, E., & Göktepe, M. (2020). Vertical jump performance in female volleyball players acutely applied different effect of stretching exercises. *Atatürk University Journal of Physical Education and Sport Sciences, 22*(4), 148-157.

İmamoğlu, A. F. (1992). Some observations on Turkish sports towards two thousand years. *Journal of Gazi Education Faculty*, *8*(1), 9-19.

Iordan, D. A., Mocanu, G. D., Mocanu, M. D., Munteanu, C., Constantin, G. B., Ilie, O. N. U., & Nechifor, A. (2021). Age-related, sport-specific dysfunctions of the shoulder and pelvic girdle in athletes table tennis players. Observational study. *Balneo and PRM Research Journal*, *12*(4), 337-344.

Isık, O., Ozarslan, A., & Bekler, F. (2015). The Relationship between Physical Activity, Sleep Quality and Depression in University Students. *Journal of Physical Education and Sport Sciences*, *9*(Special Issue), 65-73.

Kalaycı, M.C., Eroğlu, H. (2016). Investigation of sexual life in adult men by physical activity level. *CBU Journal of Physical Education and Sport Sciences*.

Keyf, E. (2018). *Examination of physical activity levels of individuals who do sports*. Erzincan Binali Yıldırım University Institute of Health Sciences Department of Physical Education and Sports, Erzincan.

Kilci, A.K. (2019). *The ultimate in sports and digital gaming*: ESPOR. Ankara: Gazi Bookstore.

Kilci, A.K., & Yalçıner, S. (2020). The effect of motivation to play digital sports games on moral decision-making attitudes: A study on esports players. *International Social Sciences Studies Journal*, *6*(68), 3641-3649.

Kırbaş, Ş. (2020). Investigation of the relationship between physical activity level and quality of life of provincial directorate of youth and sports personnel. *Gazi Journal of Physical Education and Sports Sciences*, 213-224.

Kızar, O., Kargün, M., Togo, T.O., Biner, M., & Pala, A. (2019). Examining the physical activity levels of university students. *Marmara University Journal of Sport Sciences*, *1*(1), 63-74.

Küçük, E.Ö. (2012). *Determination of physical activity levels of children with cerebral palsy and comparison with physical activity levels of children with normal development*. Hacettepe University, Institute of Health Sciences, Master Thesis, Ankara.

Miller, D. J., Freedson, P. S., & Kline, G. M. (1994). Comparison of activity levels using the Caltrac accelerometer and five questionnaires. *Medicine and Science in Sports and Exercise*, *26*(3), 376-382.

Öztürk, M. (2005). *Validity and reliability of international physical activity questionnaire (IPAQ) and determination of physical activity level in university students*. Master Thesis, Hacettepe University, Ankara.

Rus, C.M., Talaghir, L-G., Iconomescu, T.M, Petrea, R.G., (2019). Curriculum changes in secondary school physical education and sport subject in the romanian education system. *Journal of Research and Social Intervention*, *66,* 342-363. https://doi.org/10.33788/rcis.66.20

Sallis, J. F., Haskell, W. L., Wood, P. D., Fortmann, S. P., Rogers, T., Blair, S. N., & Paffenbarger Jr, R. S. (1985). Physical activity assessment methodology in the Five-City Project. *American Journal of Epidemiology*, *121*(1), 91-106.

Şanli, E., & Güzel, N. A. (2009). The relationship between physical activity level-age, gender and body mass index in teachers. *Gazi Journal of Physical Education and Sports Sciences, 14*(3), 23-32.

Solmaz, D. Y., & Aydın, G. (2016). Physical activity levels of students studying at the faculty of sports sciences. İnönü University *Journal of Physical Education and Sport Sciences*, *3*(1), 34-46.

Steptoe, A., Wardle, J., Fuller, R., Holte, A., Justo, J., Sanderman, R., & Wichstrom, L. (1997). Leisure-time physical exercise: prevalence, attitudinal correlates,

and behavioral correlates among young Europeans from 21 countries. *Preventive Medicine*, *26*, 845-54.

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5). Pearson.

Yaman, İ. (2021). *Examining the physical activity and activity status of university students by age and gender*. Selcuk University, Institute of Health Sciences, Department of Physical Education and Sports, Konya.